

CLAIMS

What is claimed is:

1. A system for concentrically aligning and attaching a disk clamp to a hub of a motor in a hard disk drive, comprising:

a hub of a motor having a plurality of fastener openings formed on a bolt circle diameter, and an annular recess formed in and circumscribing the hub, the annular recess defining an outer wall;

a disk clamp having a plurality of apertures extending therethrough at the bolt circle diameter, and an annular rim protruding from the disk clamp, the annular rim defining an inner wall; and

the disk clamp being centered on the hub by engaging the inner wall of the disk clamp with the outer wall of the hub such that the annular rim of the disk clamp is closely received by and seats in the annular recess in the hub.

2. The system of claim 1, wherein the bolt circle diameter is radially outboard of the central bore, and the hub has an outer circumference at a perimeter of the hub that is radially outboard of the bolt circle diameter, and the annular recess is located radially between the bolt circle diameter and the outer circumference.

3. The system of claim 1, wherein the disk clamp has an outer clamp circumference at a perimeter of the disk clamp, and the annular rim is located radially between the bolt circle diameter of the disk clamp and the outer clamp circumference.

4. The system of claim 1, wherein the disk clamp is assembled to the hub by extending fasteners through the apertures in the disk clamp and into engagement with the fastener openings in the hub.

5. A hard disk drive, comprising:

an enclosure;

a motor mounted to the enclosure, the motor having a shaft, a hub with a central bore, a plurality of fastener openings formed on a bolt circle diameter, an outer circumference at a perimeter of the hub, and a bearing assembly that is located radially between the shaft and the hub in the central bore of the hub, the bearing assembly having a bearing sleeve that defines an outer wall;

a disk clamp having a central opening and a plurality of apertures extending through the disk clamp at the bolt circle diameter, the central opening defining an inner wall, the disk clamp being concentrically aligned with and attached to the motor by engagement between the inner wall of the disk clamp and the outer wall of the bearing sleeve, such that the disk clamp is closely received by and seats on the bearing assembly in the hub;

a disk for information storage and retrieval mounted to the hub for rotation therewith, the disk being secured to the hub with the disk clamp; and

an actuator assembly mounted to the enclosure for movement relative to the enclosure and the disk, the actuator having a head gimbal assembly with a head for reading data from and writing data to the disk.

6. The hard disk drive of claim 5, wherein the bolt circle diameter is radially outboard of the central bore of the hub, the outer circumference of the hub is radially outboard of the bolt circle diameter, and the disk clamp has an outer clamp circumference at a perimeter of the disk clamp.

7. The hard disk drive of claim 5, wherein the outer wall of the bearing sleeve protrudes axially from the central opening beyond an axial end of the hub.

8. A method of concentrically aligning and attaching a disk clamp to a hub of a motor in a hard disk drive, the method comprising:

- (a) providing a hub of a motor with an annular recess formed in and circumscribing the hub, the annular recess defining an outer wall, a disk clamp having an annular rim protruding from the disk clamp, the annular rim defining an inner wall;
- (b) mounting a disk to the hub;
- (b) placing the disk clamp on the hub to retain the disk on the hub;
- (c) aligning the annular rim on the disk clamp with the annular recess in the hub, such that the disk clamp is centered on the hub by engaging the inner wall of the disk clamp with the outer wall of the hub; and
- (d) closely receiving and seating the annular rim of the disk clamp in the annular recess in the hub to form a disk pack assembly.

9. The method of claim 8, wherein step (a) comprises providing the hub with a bolt circle diameter that is radially outboard of a central bore in the hub, an outer circumference at a perimeter of the hub that is radially outboard of the bolt circle diameter, and locating the annular recess radially between the bolt circle diameter and the outer circumference.

10. The method of claim 8, wherein step (a) comprises providing the disk clamp with an outer clamp circumference at a perimeter of the disk clamp, and locating the annular rim radially between a bolt circle diameter of the disk clamp and the outer clamp circumference.

11. The method of claim 8, further comprising the step of assembling the disk clamp to the hub by extending fasteners through the disk clamp and into engagement with fastener openings in the hub.

12. A method of concentrically aligning and attaching a disk clamp to a motor in a hard disk drive, the method comprising:

- (a) providing a motor with a hub, a shaft located in a bore of the hub, and a bearing assembly located between the shaft and the bore of the hub, the bearing assembly defining an outer wall;
- (b) mounting a disk to the hub;
- (b) placing a disk clamp on the hub to retain the disk on the hub, the disk clamp having a central opening that defines an inner wall;
- (c) aligning the central opening in the disk clamp with the bearing assembly in the hub, such that the disk clamp is centered on the hub by engaging the inner wall of the disk clamp with the outer wall of the bearing assembly; and
- (d) closely receiving and seating the inner wall of the disk clamp on the outer wall on the bearing assembly to form a disk pack assembly.

13. The method of claim 12, wherein step (a) comprises axially extending the outer wall of the bearing assembly beyond an axial end of the hub.